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In re US Appln. of : Yozo YOSHIMURA

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For : Network Administration System and Method of Re-arranging Network Resources

VERIFICATION OF TRANSLATION

Commissioner of Patents & Trademarks
Washington, DC 20231

The undersigned residing at Minemura Bluding 2F, 6-4, Shiba 4-chome, Minato-ku, Tokyo, Japan declares:

(1) that I know well both the Japanese and English languages;

(2) that I translated the above-identified Japanese Application from Japanese to English;

(3) that the attached English translation is a true and correct translation of the Japanese-language manuscript (Exhibit A) of the above-identified Japanese Application to the best of my knowledge and belief; and

(4) that all statements made of my own knowledge are true and that all statements made on information and belief are with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 USC § 1001, and that such false statements may jeopardize the validity of the application or any patent issuing therefrom.

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This is to certify that the annexed is a true copy of the following application as filed with this Office.

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[Title of the Invention] Network administration system and Method of controlling a failure rate of the system

[Claims]

[Claim 1] A network administration system comprising a network administrator which performs re-arrangement of network resources,

said network administrator including:

means for obtaining past cell data similar to data of present cell obtained after network resources have been re-arranged, and calculating a probability at which failures would occur, based on said past cell data;

means for estimating a probability at which failures would occur in a cell in which network resources have been re-arranged;

means for indicating data indicative of said probability in each of cells in which network resources have been re-arranged; and

means for repeating re-arrangement of network resources for minimizing said probability.

[Claim 2] The network administration system as set forth in claim 1, further comprising:

a MTBF data database storing MTBF data indicative of mean time between failures (MTBF) of components constituting a mobile communication system;

a failure data database storing past failure data of components constituting a cell for each of cells; and

a cell site data database storing cell site data indicative of past traffic for each of cells.

[Claim 3] The network administration system as set forth in claim 2, further comprising a cell site which informs said network administrator of said cell site data in each of cells.

[Claim 4] The network administration system as set forth in claim 3, wherein said network administrator further includes means for calculating a

probability at which failures would occur, based on said MTBF data stored in said MTBF data database, said past failure data stored in said failure data database, and said cell site data stored in said cell site data database.

[Claim 5] The network administration system as set forth in claim 4, wherein said network administrator further includes means for constructing and retrieving said MTBF data database, said failure data database, and said cell site data database.

[Claim 6] The network administration system as set forth in claim 5 wherein said network administrator further includes means for comparing said MTBF data stored in said MTBF data database, said past failure data stored in said failure data database, and said cell site data stored in said cell site data database with one another, and calculating a probability at which failures would occur in the re-arranged mobile communication network, in each of cells.

[Claim 7] A method of controlling a probability at which failures would occur in a cell, comprising the network administration step of re-arranging network resources,

said network administration step including the steps of:

obtaining past cell data similar to data of present cell obtained after network resources have been re-arranged, and calculating a probability at which failures would occur, based on said past cell data;

estimating a probability at which failures would occur in a cell in which network resources have been re-arranged;

indicating data indicative of a probability at which failures would occur in each of cells in which network resources have been re-arranged; and

repeating re-arrangement of network resources for minimizing said probability.

[Claim 8] The method as set forth in claim 7, further including the DB storage step comprised of the steps of:

making MTBF data indicative of mean time between failures (MTBF) of

components constituting a mobile communication system, and storing said MTBF data in a MTBF data database;

making past failure data of components constituting a cell for each of cells, and storing said past failure data in a failure data database; and

making cell site data indicative of past traffic for each of cells, and storing said cell site data in a cell site data database.

[Claim 9] The method as set forth in claim 8, further including the step of transmitting said traffic data in each of cells to a network administrator from a cell site.

[Claim 10] The method as set forth in claim 9, wherein said network administration step includes the step of calculating a probability at which failures would occur, based on said MTBF data stored in said MTBF data database, said past failure data stored in said failure data database, and said cell site data stored in said cell site data database.

[Claim 11] The method as set forth in claim 10, wherein said network administration step includes the step of constructing and retrieving said MTBF data database, said failure data database, and said cell site data database.

[Claim 12] The method as set forth in claim 11, wherein said network administration step includes the step of comparing said MTBF data stored in said MTBF data database, said past failure data stored in said failure data database, and said cell site data stored in said cell site data database with one another, and calculating a probability at which failures would occur in the re-arranged mobile communication network, in each of cells.

[Claim 13] The method as set forth in claim 8, wherein said DB storage step includes the steps of:

storing said MTBF data of components constituting said mobile communication network, into said MTBF data database in each of cells;

accumulating said failure data transmitted as an alarm to said network administrator from said mobile communication network, into said failure data

database for each of cells to thereby automatically register past failure data of past failures which occurred in each of cells, into said failure data database; and

accumulating data collected as said cell site data to said network administrator from said mobile communication network, into said cell site data database for each of cells to thereby automatically register said cell site data in each of cells into said cell site data database.

[Claim 14] The method as set forth in claim 13, wherein said network administration step includes the DB processing step of administrating past cell data similar to present cell data in each of cells.

[Claim 15] The method as set forth in claim 14, wherein said network administration step includes the DB data inputting steps of retrieving past cell data similar to present cell data in each of cells in a database administrated by said DB processing step, and collecting past cell data similar to present cell data out of said database.

[Claim 16] The method as set forth in claim 15, wherein said network administration step includes the steps of re-arranging network resources of a cell to which traffic is estimated to concentrate, through said network administration step, by said network administrator, producing present cell data of a target cell, and outputting said present cell data into said DB data inputting step.

[Claim 17] The method as set forth in claim 16, wherein said network administration step includes the steps of extracting data indicative of a frequency at which failures occurred, out of said past cell data and said present cell data obtained from said DB data inputting step, and calculating a failure probability in accordance with the equation X/Y wherein X indicates data about past cells in which failures occurred, and Y indicates data about all past cells.

[Claim 18] The method as set forth in claim 17, wherein said network administration step includes the steps of displaying said failure probability as a failure probability of a cell in which network resources have been re-arranged, and informing a network administrator of said failure probability.

[Claim 19] The method as set forth in claim 18, wherein said network administration step includes the judgment step of judging whether estimate of re-arrangement of network resources in a present cell has a problem, based on said failure probability displayed in said network administration step, wherein if said estimate of re-arrangement of network resources had a problem, said re-arrangement of said network resources and subsequent steps are repeatedly carried out, and if said estimate of re-arrangement of network resources had no problems, said re-arrangement of network resources is finished.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The invention relates to network administration, and more particularly to a network administration system and a method of reducing a failure probability in components constituting a mobile communication network, both of which make it possible to objectively estimate re-arrangement of network resources, based on past data, transmit an instruction for dispatching a maintenance crew to a cell to which traffic is concentrated, and display variance of a mobile communication network as a probability at which a failure occurs in each of cells.

[0002]

In these days, there is a remarkable need for mobile communication. Since data communication service had been commenced, traffic in a network is increasing and increasing. With such increase in traffic, it becomes more and more difficult for a network administrator to properly administrate a network in comparison with an existing fixed network.

[0003]

A network administrator usually estimates an increase in traffic, based on everyday data and his/her experience. A network administrator further identifies a cell site to which traffic is concentrated, and arrange maintenance

personnel and optimize communication lines, based on his/her experience. Hence, it is quite difficult to estimate failures in a component or components constituting a cell cite to which traffic is concentrated, and resultingly, a network administrator deals with a failure when it actually occurs (first prior art).

[0004]

As a system for detecting a failure in such component or components, there have been suggested a system in which a mobile communication network makes an alarm when a failure occurs, a system in which traffic data is monitored for predetermined period of time to thereby estimate a failure in a mobile communication network, and an expert system in which artificial intelligence is used for diagnosing a component or components constituting a cell cite (second prior art).

[0005]

In the conventional diagnosing system making use of artificial intelligence (expert), functions of components constituting a cell site are input into artificial intelligence so that the artificial intelligence studies a solution to repair the components when they go out of order. Such a solution as well as a component in failure is informed to a network administrator.

[0006]

[Problems to be solved by the Invention]

The above-mentioned prior systems provide merely solutions to failures which occurred in a mobile communication network. Hence, in accordance with the systems, even if a network administrator can estimate that a failure will occur in a certain component in a mobile communication network because of traffic concentration, based on his/her experiences, he/she cannot do anything to such a failure until it does actually occur.

[0007]

In addition, the expert system is accompanied with problems that it takes much time to input functions of components into artificial intelligence, and

that an accuracy with which causes of a failure are detected is deteriorated in dependence on what artificial intelligence studies.

[0008]

In view of the above-mentioned problems in the prior art, it is an object of the present invention to provide a network administration system and a method of controlling a failure probability both of which are capable of objectively estimating re-arrangement of network resources, based on past data, transmitting an instruction for dispatching a maintenance crew to a cell to which traffic is concentrated, thereby smoothly dealing with a failure, and displaying variance of a mobile communication network as a probability at which a failure occurs in each of cells, for making it possible for a network administrator to grasp a status of the mobile communication network.

[0009]

[Solution to the Problems]

The present invention provides, in claim 1, a network administration system including a network administrator which performs re-arrangement of network resources, the network administrator including means for obtaining past cell data similar to data of present cell obtained after network resources have been re-arranged, and calculating a probability at which failures would occur, based on the past cell data, means for estimating a probability at which failures would occur in a cell in which network resources have been re-arranged, means for indicating data indicative of the probability in each of cells in which network resources have been re-arranged, and means for repeating re-arrangement of network resources for minimizing the probability.

The present invention provides, in claim 2, the network administration system as set forth in claim 1, further including a MTBF data database storing MTBF data indicative of mean time between failures (MTBF) of components constituting a mobile communication system, a failure data database storing past failure data of components constituting a cell for each of cells, and a cell site data

database storing cell site data indicative of past traffic for each of cells.

The present invention provides, in claim 3, the network administration system as set forth in claim 2, further including a cell site which informs the network administrator of the cell site data in each of cells.

The present invention provides, in claim 4, the network administration system as set forth in claim 3, wherein the network administrator further includes means for calculating a probability at which failures would occur, based on the MTBF data stored in the MTBF data database, the past failure data stored in the failure data database, and the cell site data stored in the cell site data database.

The present invention provides, in claim 5, the network administration system as set forth in claim 4, wherein the network administrator further includes means for constructing and retrieving the MTBF data database, the failure data database, and the cell site data database.

The present invention provides, in claim 6, the network administration system as set forth in claim 5 wherein the network administrator further includes means for comparing the MTBF data stored in the MTBF data database, the past failure data stored in the failure data database, and the cell site data stored in the cell site data database with one another, and calculating a probability at which failures would occur in the re-arranged mobile communication network, in each of cells.

The present invention provides, in claim 7, a method of controlling a probability at which failures would occur in a cell, including the network administration step of re-arranging network resources, the network administration step including the steps of obtaining past cell data similar to data of present cell obtained after network resources have been re-arranged, and calculating a probability at which failures would occur, based on the past cell data, estimating a probability at which failures would occur in a cell in which network resources have been re-arranged, indicating data indicative of a

probability at which failures would occur in each of cells in which network resources have been re-arranged, and repeating re-arrangement of network resources for minimizing the probability.

The present invention provides, in claim 8, the method as set forth in claim 7, further including the DB storage step comprised of the steps of making MTBF data indicative of mean time between failures (MTBF) of components constituting a mobile communication system, and storing the MTBF data in a MTBF data database, making past failure data of components constituting a cell for each of cells, and storing the past failure data in a failure data database, and making cell site data indicative of past traffic for each of cells, and storing the cell site data in a cell site data database.

The present invention provides, in claim 9, the method as set forth in claim 8, further including the step of transmitting the traffic data in each of cells to a network administrator from a cell site.

The present invention provides, in claim 10, the method as set forth in claim 9, wherein the network administration step includes the step of calculating a probability at which failures would occur, based on the MTBF data stored in the MTBF data database, the past failure data stored in the failure data database, and the cell site data stored in the cell site data database.

The present invention provides, in claim 11, the method as set forth in claim 10, wherein the network administration step includes the step of constructing and retrieving the MTBF data database, the failure data database, and the cell site data database.

The present invention provides, in claim 12, the method as set forth in claim 11, wherein the network administration step includes the step of comparing the MTBF data stored in the MTBF data database, the past failure data stored in the failure data database, and the cell site data stored in the cell site data database with one another, and calculating a probability at which failures would occur in the re-arranged mobile communication network, in each

of cells.

The present invention provides, in claim 13, the method as set forth in claim 8, wherein the DB storage step includes the steps of storing the MTBF data of components constituting the mobile communication network, into the MTBF data database in each of cells, accumulating the failure data transmitted as an alarm to the network administrator from the mobile communication network, into the failure data database for each of cells to thereby automatically register past failure data of past failures which occurred in each of cells, into the failure data database, and accumulating data collected as the cell site data to the network administrator from the mobile communication network, into the cell site data database for each of cells to thereby automatically register the cell site data in each of cells into the cell site data database.

The present invention provides, in claim 14, the method as set forth in claim 13, wherein the network administration step includes the DB processing step of administrating past cell data similar to present cell data in each of cells.

The present invention provides, in claim 15, the method as set forth in claim 14, wherein the network administration step includes the DB data inputting steps of retrieving past cell data similar to present cell data in each of cells in a database administrated by the DB processing step, and collecting past cell data similar to present cell data out of the database.

The present invention provides, in claim 16, the method as set forth in claim 15, wherein the network administration step includes the steps of re-arranging network resources of a cell to which traffic is estimated to concentrate, through the network administration step, by the network administrator, producing present cell data of a target cell, and outputting the present cell data into the DB data inputting step.

The present invention provides, in claim 17, the method as set forth in claim 16, wherein the network administration step includes the steps of extracting data indicative of a frequency at which failures occurred, out of the

past cell data and the present cell data obtained from the DB data inputting step, and calculating a failure probability in accordance with the equation X/Y wherein X indicates data about past cells in which failures occurred, and Y indicates data about all past cells.

The present invention provides, in claim 18, the method as set forth in claim 17, wherein the network administration step includes the steps of displaying the failure probability as a failure probability of a cell in which network resources have been re-arranged, and informing a network administrator of the failure probability.

The present invention provides, in claim 19, the method as set forth in claim 18, wherein the network administration step includes the judgment step of judging whether estimate of re-arrangement of network resources in a present cell has a problem, based on the failure probability displayed in the network administration step, wherein if the estimate of re-arrangement of network resources had a problem, the re-arrangement of the network resources and subsequent steps are repeatedly carried out, and if the estimate of re-arrangement of network resources had no problems, the re-arrangement of network resources is finished.

[0010]

[Embodiments of the Invention]

In a mobile communication system in which a telephone terminal now making a call moves, a coverage area (hereinafter, called "cell") of a wireless base station (hereinafter, called "cell site") to which traffic is concentrated varies day by day. Thus, since it is quite difficult for a network administrator to properly re-arrange and increase network resources in a cell to which traffic is expected to be concentrated, based on his/her experiences.

[0011]

In the present invention, when re-arrangement of network resources is performed by a network administrator, the network administrator obtains past

cell data similar to data of present cell obtained after network resources have been re-arranged, calculates a probability at which failures would occur, based on the past cell data, estimates a probability at which failures would occur in a cell in which network resources have been re-arranged, indicates data indicative of a probability at which failures would occur in each of cells in which network resources have been re-arranged, and repeats re-arrangement of network resources for minimizing the probability.

[0012]

FIG. 1 is a functional block diagram of a network administration system 100 in accordance with an embodiment of the present invention. In FIG. 1, 1 to n indicates cell sites, 11 indicates a MTBF (Mean Time Between Failures) data database, 12 indicates a failure data database, 13 indicates a cell site data database, 14 indicates a network administrator, 15 indicates a mobile communication network, and 100 indicates a network administration system in accordance with the embodiment.

[0018]

As illustrated in FIG. 1, the network administration system 100 is comprised of a MTBF data database 11 storing MTBF data of components constituting a mobile communication network 15, a failure data database 12 storing past failure data of components constituting each of cells, a cell site data database 13 storing data (cell site data) about past traffic in each of cells, a network administrator 14 which calculates a failure probability, based on the MTBF data stored in the MTBF data database 11, past failure data stored in the failure data database 12, and past traffic data (cell site data) stored in the cell site data database 13, and cell sites 1 to n each of which transmits traffic data for each of cells to the network administrator 14.

[0014]

The network administrator 14 includes functions of producing and retrieving the MTBF data databases 11, the failure data database 12, and the cell

site data database 13, and comparing the MTBF data stored in the MTBF data databases 11, past failure data stored in the failure data database 12, and past traffic data (cell site data) stored in the cell site data database 13 with one another to thereby calculate a failure probability in each of cells in the mobile communication network 15 in which network resources have been re-arranged.

[0015]

FIG. 2 is a functional block diagram of the network administration system 100. Hereinbelow is explained the DB registration step in the embodiment. With reference to FIG. 2, MTBF data of components constituting the network communication network 15 is registered into the first database 11 for each of cells. MTBF data is manually updated by an operator of the network administrator 14 when a base station is built or repaired.

[0016]

Data about past failures in each of cells is automatically registered into the failure data database 12. Specifically, data about failures transmitted to the network administrator 14 from the mobile communication network 15 as an alarm is accumulated in the failure data database 12 for each of cells.

[0017]

Data about past traffic in each of cells is automatically registered into the cell site data database 13. Specifically, data about past traffic (cell site data) transmitted to the network administrator 14 from the mobile communication network 15 is accumulated in the cell site data database 13 for each of cells.

[0018]

Hereinbelow is explained re-arrangement of network resources in the embodiment. FIG. 3 is a flow chart showing steps for an administrator of the network administration system to re-arrange network resources in a cell to which traffic is concentrated.

[0019]

With reference to FIG. 3, an administrator of the network

administration system 100 re-arranges network resources in a cell to which traffic is expected to concentrate, through the network administrator 14, in the re-arrangement step (step S31).

[0020]

After the re-arrangement step (step S31) has been completed by the network administrator, the network administrator 14 produces data about present status of a target cell, and transmits the thus produced data to a DB data input program in the DB data input step (step S32), as illustrated in FIG. 3.

[0021]

In the DB data input step (step S32), as illustrated in FIG. 3, the network administrator retrieves a database fabricated in the DB processing step (step S35) to collect data about past cells similar to data about present cells.

[0022]

The data about past and present cells obtained in the DB data input step (step S32) is transmitted to an analysis program which will carry out the analysis step (step S33).

[0023]

In the analysis step (step S33), data indicative of a frequency at which failures occurred is extracted out of data about past cells, and then, a failure probability is calculated by dividing data about past cells in which failures occurred, by data about all past cells.

[0024]

The thus calculated failure probability is displayed in a screen in the network administrator 14 as a failure probability of a cell in which network resources have been re-arranged, and is informed to an administrator of the network administration system who had performed the re-arrangement step (step S31).

[0025]

In the judgment step (step S34), an administrator of the network

administration system 100 looks at the failure probability displayed in a screen of the network administrator 14, and judges whether a re-arrangement of network resources in a present cell, which re-arrangement was estimated in the re-arrangement step (step S81), is proper or not. If the re-arrangement is not proper (NG in step S34), the re-arrangement step (step S81) and the subsequent steps are repeatedly carried out. If the re-arrangement is proper (OK in step S34), the re-arrangement of network resources is finished.

[0026]

Hereinbelow is explained a method of calculating a failure probability in the embodiment. FIG. 4 is a flow chart showing steps of calculating a failure probability in the network administrator 14. In FIG. 4, each of 431 to 43T indicates past cell data, and each of A to N indicates a cell identifier.

[0027]

With reference to FIG. 4, data indicative of present status of a cell, used in step S41, is automatically produced by the network administrator 14 when an administrator of the network administration system 100 re-arranges network resources, as shown in the re-arrangement step (step S31) in FIG. 3. The data indicative of present status of a cell includes data about components constituting a cell, the cell identifiers A to N inherent to the mobile communication network 15, and estimated traffic.

[0028]

In step S45, data about components constituting the network administration system 100, date at which the network administration system 100 is constituted of the components, and the cell identifiers A to L are stored into the MTBF data database 11 as first data [cell identifiers A to N, component data, date].

[0029]

In step S46, date at which a failure occurred, data about past failures, and the cell identifiers A to M are stored into the failure data database 12 as

second data [cell identifiers A to N, failure data, date].

[0030]

In step S47, date at which traffic was recorded, data about the traffic, and the cell identifiers A to N are stored into the cell site data database 13 as third data [cell identifiers A to N, traffic, date].

[0031]

In step S42, the network administrator 14 retrieves the MTBF data database 11 to collect data coincident with a keyword, based on both the data about present status of a cell [component data, cell identifiers A to N, traffic] transmitted from the analysis step (step S33) and the first data transmitted from step S45. The network administrator 14 further retrieves the failure data database 12 to collect data coincident with a keyword, based on both the data about present status of a cell [component data, cell identifiers A to N, traffic] transmitted from the analysis step (step S38) and the second data transmitted from step S46. The network administrator 14 still further retrieves the cell site data database 13 to collect data coincident with a keyword, based on both the data about present status of a cell [component data, cell identifiers A to N, traffic] transmitted from the analysis step (step S33) and the third data transmitted from step S47.

[0032]

In step S43, past cell data (the number of data is T) is produced and outputs, based on the data collected in step S42.

[0033]

In step S44 in FIG. 4, similarly to the analysis step (step S33), the network administrator 14 determines the number U of data about past cells in which a failure beyond a threshold level occurred, among the number T of the past cell data in step S43 and the data 431 to 43T, based on the past cell data (the number of the data is T) in step S43. Then, the network administrator 14 calculates a failure probability in accordance with the equation (U/T). After the

calculation of the probability, the thus calculated failure probability is displayed in a screen of the network administrator 14 in step S48. The above-mentioned re-arrangement steps are repeatedly carried out to thereby minimize the failure probability, and optimize arrangement of network resources.

[0034]

In a mobile communication system, a subscriber moves here and there together with his/her terminal device. Hence, traffic is concentrated to different cells with the lapse of time in the mobile communication network 15. Thus, since it was quite difficult to estimate where users make a call from their terminal devices and/or how many times users make a call, it was impossible to properly re-arrange network resources to a cell to which traffic is concentrated.

[0035]

In contrast, the embodiment makes it possible to objectively estimate re-arrangement of network resources, based on past data, ensuring optimal re-arrangement of network resources (first advantage). In addition, even if proper re-arrangement of network resources cannot be performed, it would be possible to dispatch maintenance personnel to a cell site to which traffic is concentrated, ensuring that a component in failure would be immediately repaired (second advantage).

[0036]

In addition, variance of the mobile communication network 15 with the lapse of time is displayed as the failure probability in each of cells in a screen of the network administrator 14. Hence, an administrator of the network administration system can know the failure probability any time in each of cells, and hence, can optimally operate the mobile communication network 15 in comparison with a conventional mobile communication network (third advantage). In contrast, the conventional expert system making use of artificial intelligence was a system to inform a user of a component in which a failure occurred, and a solution to the failure.

[0037]

[Advantages provided by the Invention]

It is to be understood that the subject matter encompassed by way of the present invention is not to be limited to the above-mentioned specific embodiments. On the contrary, it is intended for the subject matter of the invention to include all alternatives, modifications and equivalents as can be included within the spirit and scope of the following claims. In the figures, the same parts have been provided with the same reference numerals.

[0038]

[Advantages provided by the Invention]

Since the present invention is constructed as mentioned above, the present invention provides the following advantages.

The first advantage is that it is possible to objectively estimate re-arrangement of network resources, based on past data, and hence, properly re-arrange network resources. The second advantage is that, even if proper re-arrangement of network resources cannot be performed for some reasons, it would be possible to dispatch maintenance personnel to a cell site to which traffic is concentrated, ensuring that a component in failure would be immediately repaired. The third advantage is that a network administrator could know a failure probability any time in each of cells in a mobile communication network, and hence, can operate the mobile communication network with high stability. As a result, it is possible to operate a network more stably than a conventional network.

[Brief Description of the Drawings]

[FIG. 1]

FIG. 1 is a functional block diagram of a network administration system in accordance with an embodiment of the present invention.

[FIG. 2]

FIG. 2 is a functional block diagram showing an operation of the

network administration system illustrated in FIG. 1.

[FIG. 3]

FIG. 3 is a flow chart showing steps of a method of controlling a failure probability, in accordance with an embodiment of the present invention.

[FIG. 4]

FIG. 4 is a flow chart showing a step of calculating a failure probability in a network administrator.

[Indication by Reference Numerals]

1, ··· , n: Cell sites

11: MTBF data database

12: Failure data database

13: Cell site data database

14: Network administrator

15: Mobile communication network

100: Network administration system

431, 432, ··· , 43T: Past cell data

A, ··· , L, M, N: Cell identifier

[Name of document] Abstract

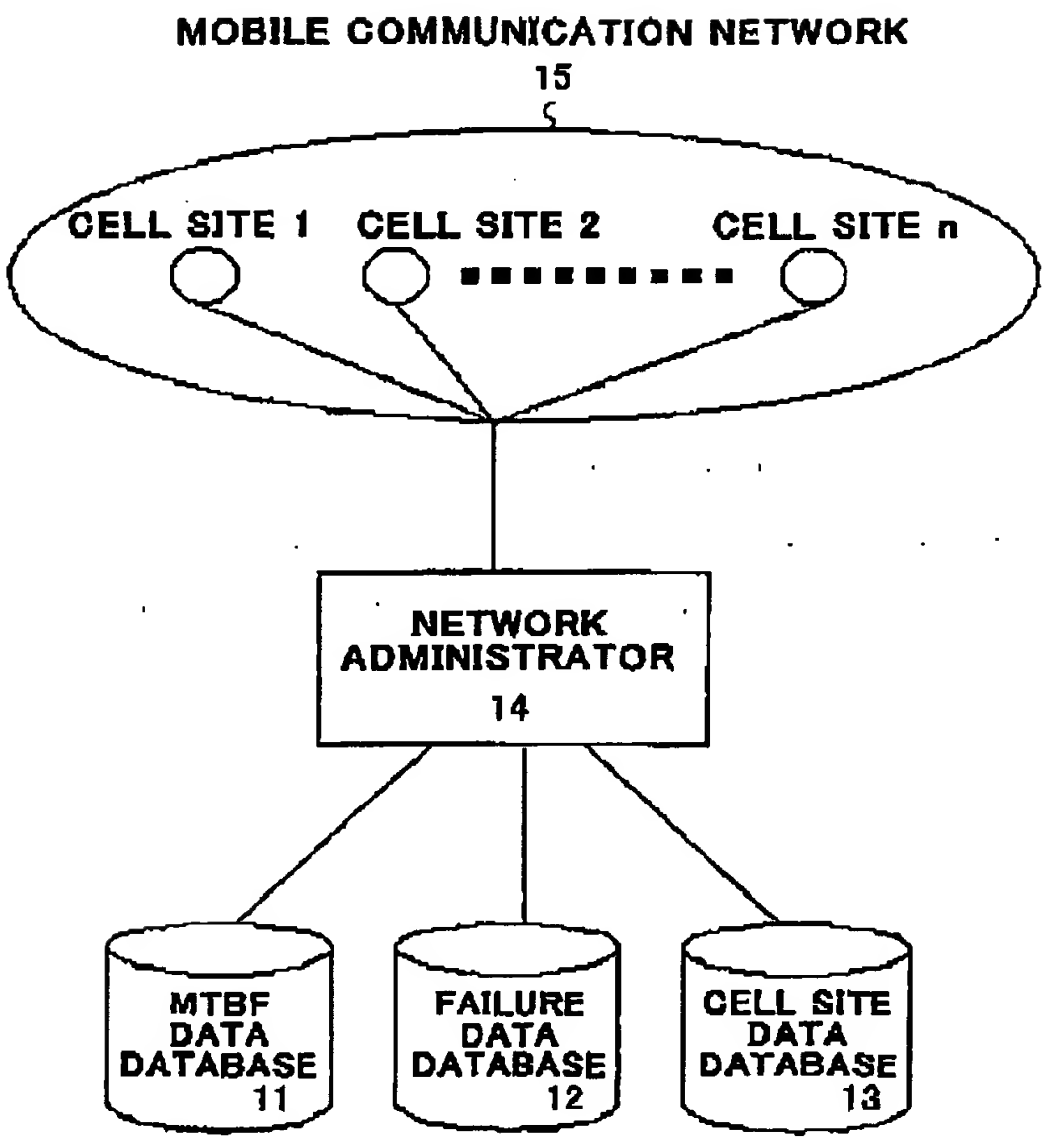
[Abstract]

[Object] It is an object of the present invention to provide a network administration system and a method of controlling a failure probability both of which are capable of objectively estimating re-arrangement of network resources, transmitting an instruction for dispatching a maintenance crew to a cell to which traffic is concentrated, and displaying variance of a mobile communication network as a probability at which a failure occurs in each of cells.

[Solution] The network administrator which performs re-arrangement of network resources includes means for obtaining past cell data, and calculating a probability at which failures would occur, means for estimating a probability at which failures would occur in a cell in which network resources have been re-arranged, means for indicating data indicative of the probability in each of cells in which network resources have been re-arranged, and means for repeating re-arrangement of network resources for minimizing the probability.

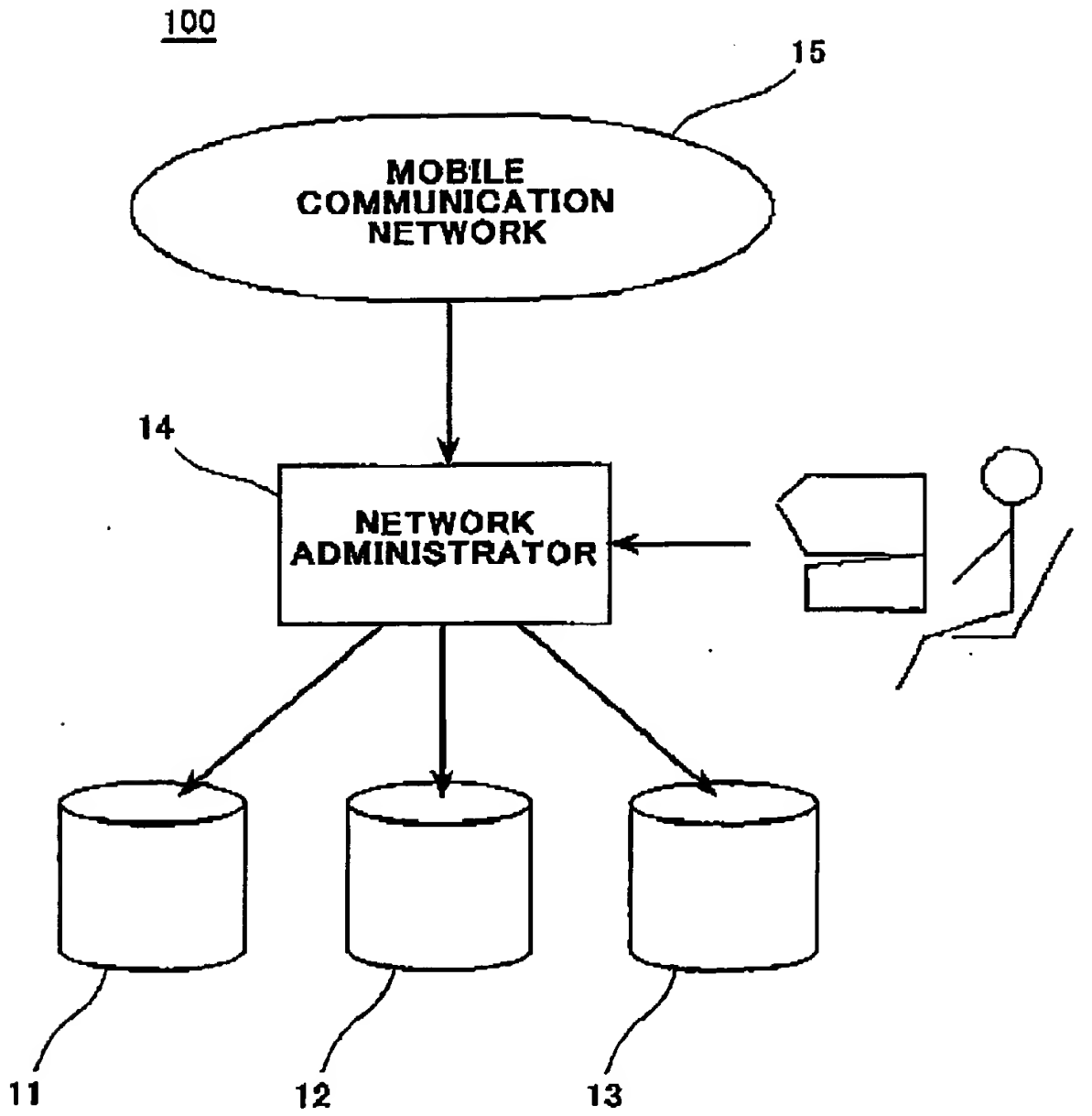
[Drawing to be published] FIG. 1

【Document Name】 Drawings
【Fig.1】



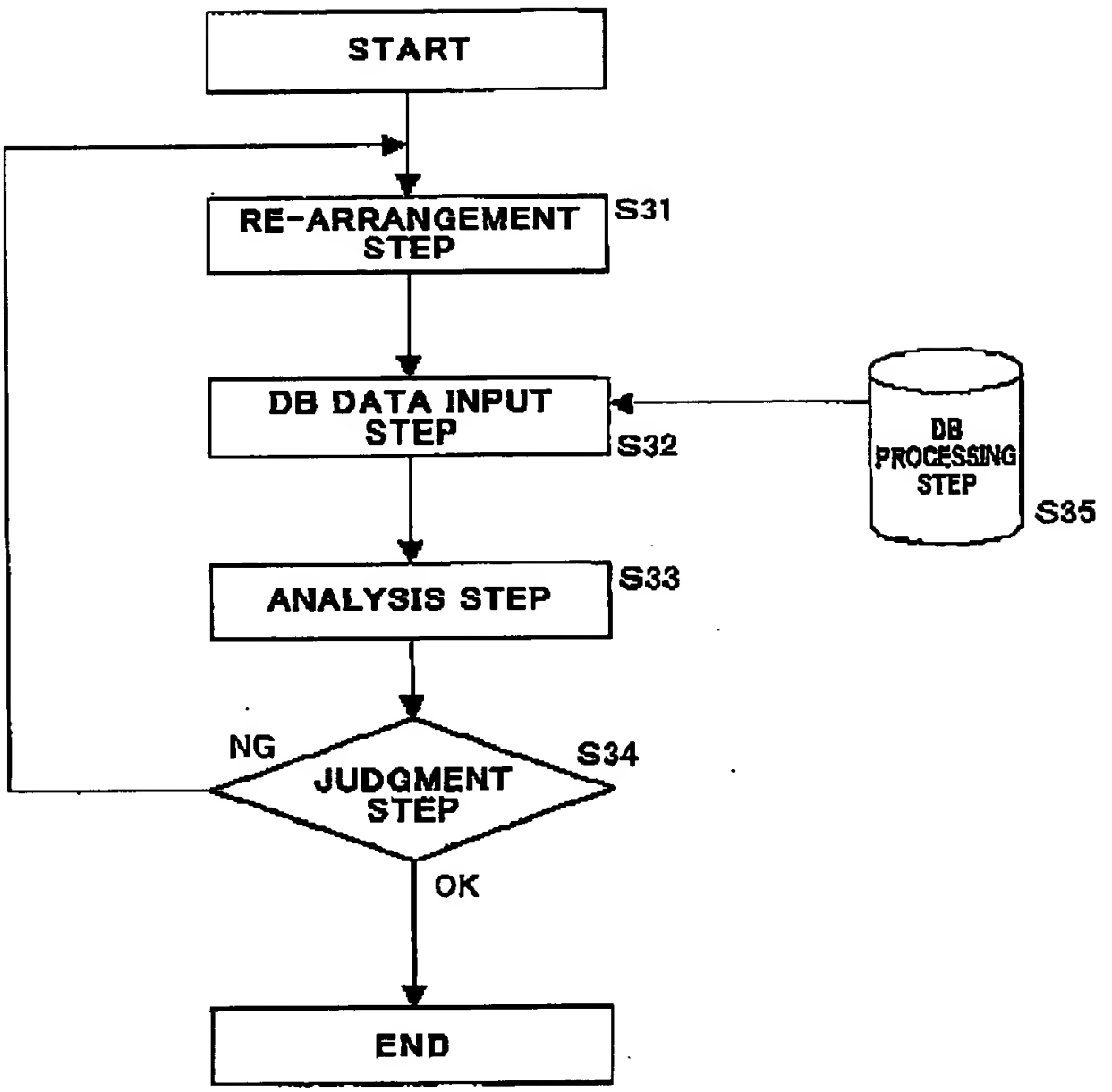
100 NETWORK ADMINISTRATION SYSTEM

【Fig.2】

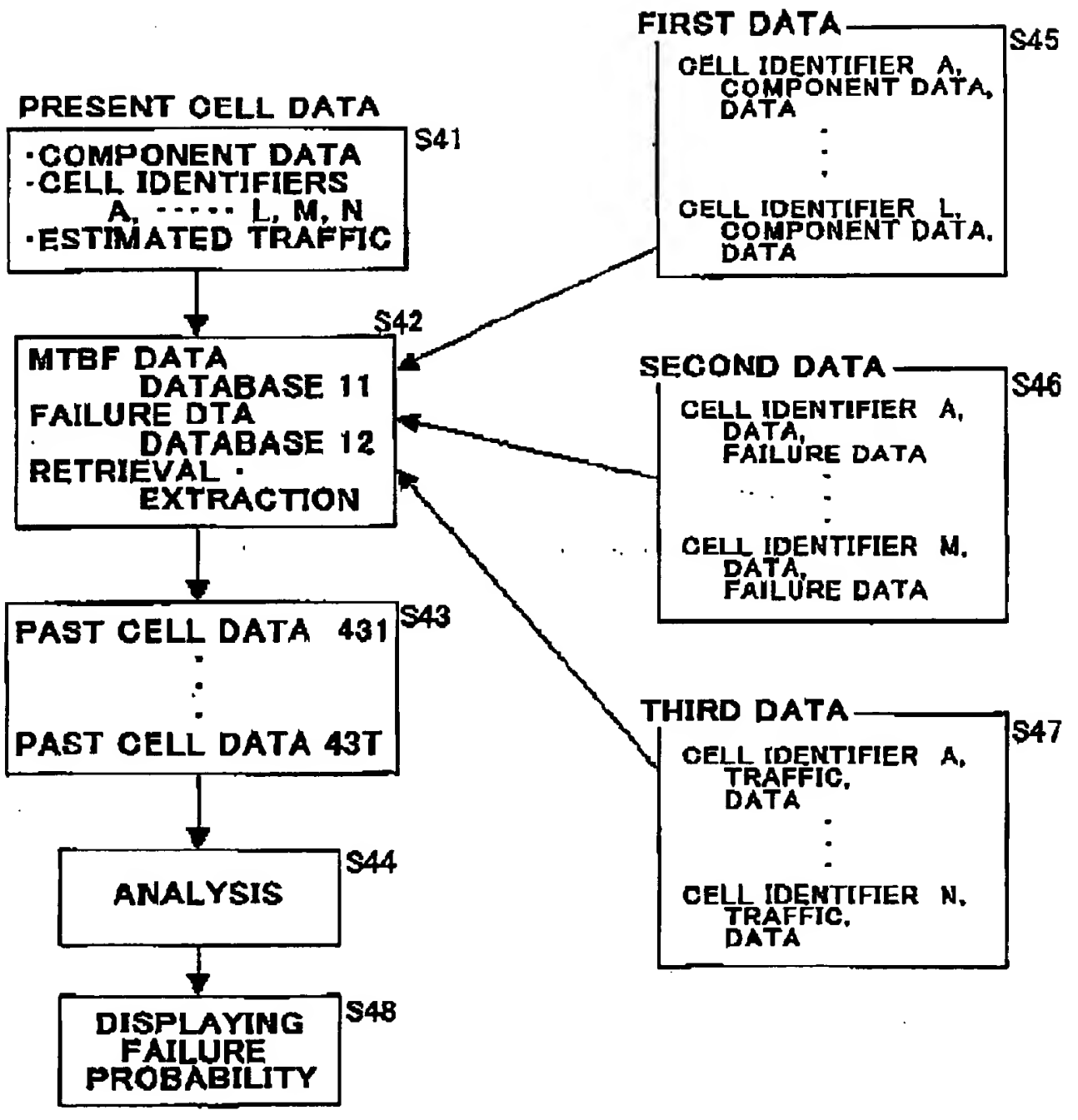


11 MTBF DATA DATABASE
12 FAILURE DATA DATABASE
13 CELL SITE DATA DATABESE
100 NETWORK ADMINISTRATION SYSTEM

【Fig.3】


START
RE-ARRANGEMENT STEP
S31
DB DATA INPUT STEP
S32
DB PROCESSING STEP
S35
ANALYSIS STEP
S33
NG
JUDGMENT STEP
S34
OK
END

【Fig.4】


PRESENT CELL DATA
·COMPONENT DATA
·CELL IDENTIFIERS
A, ····· L, M, N
·ESTIMATED TRAFFIC
S41
S42
MTBF DATA
DATABASE 11
FAILURE DTA
DATABASE 12
RETRIEVAL ·
EXTRACTION
S43
PAST CELL DATA 431
PAST CELL DATA 43T
S44
ANALYSIS
S48
DISPLAYING
FAILURE
PROBABILITY
FIRST DATA
S45
CELL IDENTIFIER A,
COMPONENT DATA,
DATA
CELL IDENTIFIER L,
COMPONENT DATA,
DATA
SECOND DATA
S46
CELL IDENTIFIER A,
DATA,
FAILURE DATA
CELL IDENTIFIER M,
DATA,
FAILURE DATA
THIRD DATA
S47
CELL IDENTIFIER A,
TRAFFIC,
DATA
CELL IDENTIFIER N,
TRAFFIC,
DATA